

INCH-POUND

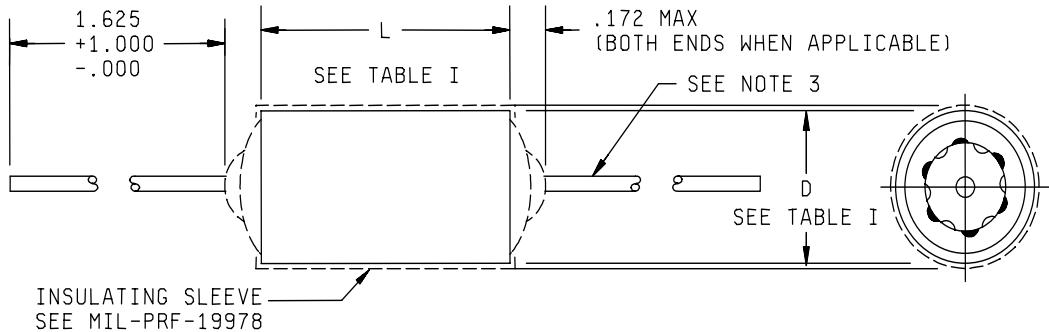
MIL-PRF-19978/22A
28 January 2003
SUPERSEDING
MIL-PRF-19978/22
16 July 2001

PERFORMANCE SPECIFICATION SHEET

CAPACITORS, FIXED, PLASTIC DIELECTRIC, AXIAL-WIRE TERMINAL, TUBULAR (INSULATED) (HERMETICALLY SEALED IN METAL CASES), ESTABLISHED RELIABILITY, STYLE CQR44

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The complete requirements for procuring the capacitors described herein
shall consist of this specification and MIL-PRF-19978.



Inches	mm	Inches	mm	Inches	mm
.001	.03	.172	4.37	.400	10.16
.004	.10	.175	4.45	.562	14.27
.020	.51	.195	4.95	1.000	25.40
.025	.64	.235	5.97	1.562	39.67
.032	.81	.312	7.92	1.625	41.28

NOTES:

- Dimensions are in inches.
- Metric equivalents are given for general information only.
- Leads shall be tinned solid wire, .020 (No. 24 AWG) for cases .175 and .195 in diameter; .025 (No. 22 AWG) for cases .235 through .312 diameter; and .032 (No. 20 AWG) for cases .400 diameter and above. Tolerance on all lead wire diameters shall be +.004, -.001.
- Capacitors with dimension L of 1.562 or D of .562 and larger, are not intended to be supported by their leads. These capacitors shall be supported with a supplementary means of mounting, such as a wrap-around band. The supporting device will not be supplied with the capacitor.
- Lead length may be a minimum of 1 inch long for use in tape and reel packaging when specified in the ordering data.

FIGURE 1. Style CQR44 capacitors.

REQUIREMENTS:

Dimensions and configuration: See figure 1 and table I.

* TABLE I. STYLES CQR44 capacitors.

Part or Identifying Number (PIN) <u>1/</u>	DC voltage rating (volts)	Capacitance rating (μF)	Capacitance tolerance	Failure rate level	Case dimensions <u>2/ 3/</u>			
					Circuit 1		Circuit 3	
					L $\pm .031$	D+.015 -.005	L $\pm .031$	D+.015 -.005
CQR44A-VA392-3-	50	.0039	J, K	M, P, R, S	.750	.175	.688	.175
CQR44A-VA472-3-	50	.0047	J, K	M, P, R, S	.750	.175	.688	.175
CQR44A-VA562-3-	50	.0056	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VA682-3-	50	.0068	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VA393-3-	50	.039	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VA473-3-	50	.047	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VA563-3-	50	.056	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VA683-3-	50	.068	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VA823-3-	50	.082	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VA104-3-	50	.1	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VA124-3-	50	.12	J, K	M, P, R, S	1.375	.400	1.312	.400
CQR44A-VA154-3-	50	.15	J, K	M, P, R, S	1.375	.400	1.312	.400
CQR44A-VA184-3-	50	.18	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VA224-3-	50	.22	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VA274-3-	50	.27	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VA334-3-	50	.33	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VA394-3-	50	.39	J, K	M, P, R, S	1.875	.562	1.812	.562
CQR44A-VA474-3-	50	.47	J, K	M, P, R, S	1.875	.562	1.812	.562
CQR44A-VA564-3-	50	.56	J, K	M, P, R, S	1.875	.670	1.812	.670
CQR44A-VA684-3-	50	.68	J, K	M, P, R, S	1.875	.670	1.812	.670
CQR44A-VA824-3-	50	.82	J, K	M, P, R, S	1.875	.750	1.812	.750
CQR44A-VA105-3-	50	1.0	J, K	M, P, R, S	1.875	.750	1.812	.750
CQR44A-VB222-3-	100	.0022	J, K	M, P, R, S	.750	.175	.688	.175
CQR44A-VB272-3-	100	.0027	J, K	M, P, R, S	.750	.175	.688	.175
CQR44A-VB332-3-	100	.0033	J, K	M, P, R, S	.750	.175	.688	.175
CQR44A-VB392-3-	100	.0039	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VB472-3-	100	.0047	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VB562-3-	100	.0056	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VB682-3-	100	.0068	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VB822-3-	100	.0082	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VB103-3-	100	.01	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VB183-3-	100	.018	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VB223-3-	100	.022	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VB273-3-	100	.027	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VB333-3-	100	.033	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VB393-3-	100	.039	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VB473-3-	100	.047	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VB563-3-	100	.056	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VB683-3-	100	.068	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VB823-3-	100	.082	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VB104-3-	100	.1	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VB124-3-	100	.12	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VB154-3-	100	.15	J, K	M, P, R, S	1.375	.562	1.312	.562

See footnotes at end of table

* TABLE I. STYLES CQR44 capacitors - Continued.

Part or Identifying Number (PIN) <u>1/</u>	DC voltage rating (volts)	Capacitance rating (μF)	Capacitance tolerance	Failure rate level	Case dimensions <u>2/ 3/</u>			
					Circuit 1		Circuit 3	
					L $\pm .031$	D+.015 -.005	L $\pm .031$	D+.015 -.005
CQR44A-VB184-3-	100	.18	J, K	M, P, R, S	1.625	.562	1.562	.562
CQR44A-VB224-3-	100	.22	J, K	M, P, R, S	1.625	.562	1.562	.562
CQR44A-VB274-3-	100	.27	J, K	M, P, R, S	1.625	.670	1.562	.670
CQR44A-VB334-3-	100	.33	J, K	M, P, R, S	1.625	.670	1.562	.670
CQR44A-VB394-3-	100	.39	J, K	M, P, R, S	1.875	.750	1.812	.750
CQR44A-VB474-3-	100	.47	J, K	M, P, R, S	1.875	.750	1.812	.750
CQR44A-VB564-3-	100	.56	J, K	M, P, R, S	2.375	.750	2.312	.750
CQR44A-VB684-3-	100	.68	J, K	M, P, R, S	2.375	.750	2.312	.750
CQR44A-VB824-3-	100	.82	J, K	M, P, R, S	1.875	1.000	1.812	1.000
CQR44A-VB105-3-	100	1.0	J, K	M, P, R, S	1.875	1.000	1.812	1.000
CQR44A-VC102-3-	200	.001	J, K	M, P, R, S	.750	.175	.688	.175
CQR44A-VC122-3-	200	.0012	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VC152-3-	200	.0015	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VC182-3-	200	.0018	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VC222-3-	200	.0022	J, K	M, P, R, S	.750	.195	.688	.195
CQR44A-VC272-3-	200	.0027	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VC332-3-	200	.0033	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VC822-3-	200	.0082	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VC103-3-	200	.01	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VC123-3-	200	.012	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VC153-3-	200	.015	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VC183-3-	200	.018	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VC223-3-	200	.022	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VC273-3-	200	.027	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VC333-3-	200	.033	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VC393-3-	200	.039	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VC473-3-	200	.047	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VC563-3-	200	.056	J, K	M, P, R, S	1.125	.500	1.062	.500
CQR44A-VC683-3-	200	.068	J, K	M, P, R, S	1.125	.500	1.062	.500
CQR44A-VC823-3-	200	.082	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VC104-3-	200	.1	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VC124-3-	200	.12	J, K	M, P, R, S	1.875	.562	1.812	.562
CQR44A-VC154-3-	200	.15	J, K	M, P, R, S	1.875	.562	1.812	.562
CQR44A-VC184-3-	200	.18	J, K	M, P, R, S	1.875	.670	1.812	.670
CQR44A-VC224-3-	200	.22	J, K	M, P, R, S	1.875	.670	1.812	.670
CQR44A-VC274-3-	200	.27	J, K	M, P, R, S	2.125	.750	2.062	.750
CQR44A-VC334-3-	200	.33	J, K	M, P, R, S	2.125	.750	2.062	.750
CQR44A-VC394-3-	200	.39	J, K	M, P, R, S	1.875	1.000	1.812	1.000
CQR44A-VC474-3-	200	.47	J, K	M, P, R, S	1.875	1.000	1.812	1.000
CQR44A-VC564-3-	200	.56	J, K	M, P, R, S	2.125	1.000	2.062	1.000
CQR44A-VC684-3-	200	.68	J, K	M, P, R, S	2.125	1.000	2.062	1.000
CQR44A-VE122-3-	400	.0012	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VE152-3-	400	.0015	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VE392-3-	400	.0039	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VE472-3-	400	.0047	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VE562-3-	400	.0056	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VE682-3-	400	.0068	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VE822-3-	400	.0082	J, K	M, P, R, S	.875	.400	.812	.400

See footnotes at end of table

* TABLE I. STYLES CQR44 capacitors - Continued.

Part or Identifying Number (PIN) <u>1/</u>	DC voltage rating (volts)	Capacitance rating (μF)	Capacitance tolerance	Failure rate level	Case dimensions <u>2/ 3/</u>			
					Circuit 1		Circuit 3	
					L $\pm .031$	D+.015 -.005	L $\pm .031$	D+.015 -.005
CQR44A-VE103-3-	400	.01	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VE123-3-	400	.012	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VE153-3-	400	.015	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VE183-3-	400	.018	J, K	M, P, R, S	1.375	.400	1.312	.400
CQR44A-VE223-3-	400	.022	J, K	M, P, R, S	1.375	.400	1.312	.400
CQR44A-VE273-3-	400	.027	J, K	M, P, R, S	1.125	.500	1.062	.500
CQR44A-VE333-3-	400	.033	J, K	M, P, R, S	1.125	.500	1.062	.500
CQR44A-VE393-3-	400	.039	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VE473-3-	400	.047	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VE563-3-	400	.056	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VE683-3-	400	.068	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VE823-3-	400	.082	J, K	M, P, R, S	1.625	.670	1.562	.670
CQR44A-VE104-3-	400	.1	J, K	M, P, R, S	1.625	.670	1.562	.670
CQR44A-VE124-3-	400	.12	J, K	M, P, R, S	2.125	.750	2.062	.750
CQR44A-VE154-3-	400	.15	J, K	M, P, R, S	2.125	.750	2.062	.750
CQR44A-VE184-3-	400	.18	J, K	M, P, R, S	2.625	.750	2.562	.750
CQR44A-VE224-3-	400	.22	J, K	M, P, R, S	2.625	.750	2.562	.750
CQR44A-VE274-3-	400	.27	J, K	M, P, R, S	2.125	1.000	2.062	1.000
CQR44A-VE334-3-	400	.33	J, K	M, P, R, S	2.125	1.000	2.062	1.000
CQR44A-VE394-3-	400	.39	J, K	M, P, R, S	2.625	1.000	2.562	1.000
CQR44A-VE474-3-	400	.47	J, K	M, P, R, S	2.625	1.000	2.562	1.000
CQR44A-VF102-3-	600	.001	J, K	M, P, R, S	.750	.235	.688	.235
CQR44A-VF122-3-	600	.0012	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VF152-3-	600	.0015	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VF182-3-	600	.0018	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VF222-3-	600	.0022	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VF272-3-	600	.0027	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VF332-3-	600	.0033	J, K	M, P, R, S	.875	.312	.812	.312
CQR44A-VF392-3-	600	.0039	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VF472-3-	600	.0047	J, K	M, P, R, S	.875	.400	.812	.400
CQR44A-VF562-3-	600	.0056	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VF682-3-	600	.0068	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VF822-3-	600	.0082	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VF103-3-	600	.01	J, K	M, P, R, S	1.125	.400	1.062	.400
CQR44A-VF123-3-	600	.012	J, K	M, P, R, S	1.125	.500	1.062	.500
CQR44A-VF153-3-	600	.015	J, K	M, P, R, S	1.125	.500	1.062	.500
CQR44A-VF183-3-	600	.018	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VF223-3-	600	.022	J, K	M, P, R, S	1.125	.562	1.062	.562
CQR44A-VF273-3-	600	.027	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VF333-3-	600	.033	J, K	M, P, R, S	1.375	.562	1.312	.562
CQR44A-VF393-3-	600	.039	J, K	M, P, R, S	1.625	.562	1.562	.562
CQR44A-VF473-3-	600	.047	J, K	M, P, R, S	1.625	.562	1.562	.562
CQR44A-VF563-3-	600	.056	J, K	M, P, R, S	1.625	.670	1.562	.670
CQR44A-VF683-3-	600	.068	J, K	M, P, R, S	1.625	.670	1.562	.670
CQR44A-VF823-3-	600	.082	J, K	M, P, R, S	1.875	.750	1.812	.750
CQR44A-VF104-3-	600	.1	J, K	M, P, R, S	1.875	.750	1.812	.750
CQR44A-VF124-3-	600	.12	J, K	M, P, R, S	1.875	1.000	1.812	1.000

See footnotes at end of table

*

TABLE I. STYLES CQR44 capacitors - Continued.

Part or Identifying Number (PIN) <u>1/</u>	DC voltage rating (volts)	Capacitance rating (μ F)	Capacitance tolerance	Failure rate level	Case dimensions <u>2/ 3/</u>			
					Circuit 1		Circuit 3	
					L ± .031	D+.015 -.005	L ± .031	D+.015 -.005
CQR44A-VF154-3-	600	.15	J, K	M, P, R, S	1.875	1.000	1.812	1.000
CQR44A-VF184-3-	600	.18	J, K	M, P, R, S	2.625	1.000	2.562	1.000
CQR44A-VF224-3-	600	.22	J, K	M, P, R, S	2.625	1.000	2.562	1.000

- 1/ Complete PIN shall include additional symbols to indicate circuit, capacitance tolerance, and failure rate level, as applicable.
2/ Dimensions are for basic case; sleeving shall extend .016 inch (0.41 mm) minimum, .062 inch (1.57 mm) maximum beyond each end of the capacitor body; however, if shrink-fitted insulation is used for the sleeving, it shall lap over the ends of the capacitor body. Add .047 inch (1.19 mm) maximum to the nominal capacitor diameter.
3/ See table II for metric equivalents.

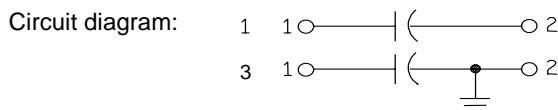
TABLE II. Millimeter equivalent of decimal inches.

Inches	mm	Inches	mm	Inches	mm	Inches	mm
0.005	0.13	0.235	5.97	0.875	22.23	1.875	47.63
0.015	0.38	0.312	7.92	1.000	25.40	2.062	52.37
0.016	0.41	0.400	10.16	1.062	26.97	2.125	53.98
0.031	0.79	0.500	12.70	1.125	28.58	2.312	58.72
0.047	1.19	0.562	14.27	1.312	33.32	2.375	60.33
0.062	1.57	0.670	17.02	1.375	34.93	2.562	65.07
0.175	4.45	0.688	17.48	1.562	39.67	2.625	66.68
0.188	4.78	0.750	19.05	1.625	41.28		
0.195	4.95	0.812	20.62	1.812	46.02		

Dielectric material: Normally polyphenylene sulfide

Case material: Nonmagnetic (end seal may be of magnetic material).

Terminals: Axial-wire lead (see figure 1).



Rated voltage: See table I.

Rated temperature: -55° to +125°C.

Capacitance (nominal): See table I.

Capacitance tolerance: See table I.

Dissipation factor (DF) (max): 0.15 percent.

Burn-in: In accordance with MIL-PRF-19978.

Radiographic inspection: In accordance with MIL-PRF-19978.

Seal: Method 112 of MIL-STD-202, test condition letter B except with mineral oil.

Dielectric withstand voltage (DWV):

Sleeving: In accordance with MIL-PRF-19978.

Barometric pressure, qualification only: In accordance with MIL-PRF-19978.

Test points:

Circuit diagram 1: Between terminals and case.

Circuit diagram 3: Between ungrounded terminal and case.

Insulation resistance (IR):

Sleeving: In accordance with MIL-PRF-19978.

Terminal to terminal: See table III.

TABLE III. Terminal-to-terminal insulation resistance.

Capacitance rating	Minimum insulation resistance
0 to 0.5 microfarad	<u>At 25°C</u> 150,000 megohms
Greater than 0.5 microfarad	75,000 megohm-microfarads <u>1/</u> <u>At 125°C</u>
0 to 0.1 microfarad	5,000 megohms
Greater than 0.1 microfarad	500 megohm-microfarads <u>1/</u>

1/ Product obtained by multiplying the capacitance in microfarads by the insulation resistance in megohms.

Vibration, high frequency: Method 204 of MIL-STD-202, test condition B, with the following exception:

Direction and duration of motion: 4 hours in each of two mutually perpendicular directions (total of 8 hours), one parallel and the other perpendicular to the cylindrical axis.

Salt spray: In accordance with MIL-PRF-19978.

Immersion:

DWV:

Sleeving: In accordance with MIL-PRF-19978.

IR:

Sleeving: In accordance with MIL-PRF-19978.

Solderability: In accordance with MIL-PRF-19978.

Terminal strength: Method 211 of MIL-STD-202, test condition letter D.

Moisture resistance:

DWV:

Sleeving: In accordance with MIL-PRF-19978.

IR:

Sleeving: In accordance with MIL-PRF-19978.

Dielectric absorption (not applicable to values of 0.01 μ F or less) (max): 0.04 percent.

Stability at low and high temperatures:

Low temperature:

Test temperature: -55°C +0°C, -5°C.

Capacitance change (max): ± 2.5 percent.

High temperature:

Test temperature: +125°C +0°C, -5°C.

Capacitance change (max): ± 3 percent.

Life:

Capacitance change (max): ± 3 percent.

Resistance to soldering heat: In accordance with MIL-PRF-19978.

The margins of this specification are marked with asterisks to indicate where changes from the previous revision were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous revision.

Custodians:

Army - CR

Navy - EC

Air Force - 11

DLA - CC

Preparing activity:

DLA - CC

(Project 5910-2221)

Review activities:

Navy - MC

Air Force - 19, 99